

Parish's Daisy (*Erigeron parishii*)

Legal Status

State: S2S3¹

CNPS: Rare Plant Rank 1B.1²

Federal: Threatened

Critical Habitat: Originally designated on December 12, 2002 (67 FR 78570–78610).

Recovery Planning: *San Bernardino Mountains Carbonate Plants Draft Recovery Plan* (USFWS 1997)

Notes: No status changes predicted by U.S. Fish and Wildlife Service (USFWS) in 2010 (75 FR 28636–28642)



Photo courtesy of Duncan S. Bell.

Taxonomy

Parish's daisy (*Erigeron parishii*) was named by Asa Gray in 1884 in his *Synoptical Flora of North America* and has remained stable with no changes since. Parish's daisy is in the sunflower family (Asteraceae) (IPNI 2011). It is an herbaceous perennial subshrub approximately 7 to 30 centimeters (3 to 12 inches) in height from its taproot. A full physical description of the species can be found in *Jepson eFlora* (Jepson Flora Project 2012).

Distribution

General

Parish's daisy is endemic to Southern California, restricted to dry, calcareous (mostly limestone) slopes of the San Bernardino Mountains, with a few collections from granitic areas at the east end of the San Bernardino Mountains and in the Little San Bernardino Mountains (Neel 2000; Sanders 2006). Parish's daisy occurs at elevations between 3,700 and 6,600 feet, most often in washes and canyon bottoms, but sometimes on alluvial benches or steep rocky

¹ **S2:** Imperiled.

² **1B:** Rare, threatened, or endangered in California and elsewhere; **X.1:** Seriously endangered in California.

mountainsides (Mistretta and White 2001). It is estimated that 1,029 acres are occupied Parish's daisy habitat (USFWS 2009).

Distribution and Occurrences within the Plan Area

Historical

Parish's daisy was first described by Asa Gray in 1884 from specimens collected by S.B. Parish at Cushenbury Springs in May 1881 (Abrams and Ferris 1960; Krantz 1979). It was reported to be "abundant on stony hillsides at Cushenberry Springs" by Hall (1907), although it is unclear whether Hall was referring to Parish's collections of the species (Sanders 2006). Within the Plan Area, the California Natural Diversity Database (CNDDB) includes two historical occurrences that were documented in 1988 and two historical occurrences for which status is unknown (Figure SP-P16). However, each of these occurrences is presumed to be extant.

Recent

Within the Plan Area, the CNDDB includes 40 recent occurrences (i.e., post-1990) of Parish's daisy and all are regarded as extant (CDFW 2013a; Figure SP-P16). The populations occur primarily on U.S. Forest Service (USFS) and BLM lands, but two of the populations on USFS and BLM lands also extend onto private lands within the Plan Area. Two populations occur within the Joshua Tree National Park and another is located on the University of California Natural Reserve System Burns Pinion Ridge Reserve (CDFW 2013a).

In 2009 the USFWS determined that the range and distribution of this species was essentially the same as it was at the time of listing (1994).

Natural History

Habitat Requirements

Parish's daisy occurs in Mojavean desert scrub and pinyon and juniper woodlands (CNPS 2011) and is largely restricted to loose, carbonate alluvium, although it is occasionally found on other rock types (Sanders 2006) (Table 1). Populations of Parish's daisy are most commonly found along washes on canyon bottoms or on loose alluvial

deposits on adjacent benches, but they are also occasionally found on steep rocky slopes (Sanders 2006). Based on this species' occurrence on noncarbonate granitic soils, it is possible that the apparent carbonate preference is due to reduced competition from other plants, although reports of this species on noncarbonate soils are few (Sanders 2006). It has also been observed at sites where soils have been found to be strongly alkaline, implying that the noncarbonate granitic soils may have been influenced in their soil chemistry by adjacent carbonate slopes (Sanders 2006).

Specific plant species associated with Parish's daisy have not been described in the literature, but dominant species within pinyon and juniper woodland where Parish's daisy is typically found include singleleaf pinyon pine (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and more rarely California juniper (*Juniperus californica*) and western juniper (*Juniperus occidentalis*). Understory species within pinyon and juniper woodland are more variable, but may include mountain-mahogany (*Cercocarpus ledifolius*), Mormon tea (*Ephedra viridis*), Mojave yucca (*Yucca schidigera*), Joshua tree (*Yucca brevifolia*), and encelia (*Encelia* sp.).

Parish's daisy co-occurs with another carbonate endemic, Cushenbury oxytheca (*Acanthoscyphus parishii* var. *goodmaniana*). Its presence, however, appears to be negatively related to at least two other carbonate soils species—Cushenbury milk-vetch (*Astragalus albens*) and Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*)—which tend to occur on more stable slopes.

Table1. Habitat Associations for Parish's Daisy

| Land Cover Type | Habitat Designation | Habitat Parameters | Supporting Information |
|---|---------------------|--|--------------------------|
| Pinyon-juniper woodland, Joshua tree woodland, Mojavean desert scrub, Jeffrey pine-western juniper woodland | Primary habitat | Carbonate soils (limestone), 3,000 to 6,600 feet | Sanders 2006; USFWS 2009 |

Reproduction

Parish's daisy is a long-lived perennial (Mistretta and White 2001) that flowers from May through August (CNPS 2011), peaking mid-May to mid-June (Sanders 2006). Based on the conspicuous flowers, pollinators are probably insects and would include bees, butterflies, and other known pollinators of similar and related species (Sanders 2006). Parish's daisy produces plumed achenes adapted for wind dispersal (Mistretta and White 2001) and does not appear to have a seed dormancy mechanism (Mistretta 1994). Based on observations of seedlings at several sites (Krantz 1979), reproduction is probably primarily by seed rather than vegetatively by rhizomes or stolons. A recent study by Neel and Ellstrand (2001) found no evidence of vegetative reproduction, concluding that the species probably primarily reproduces sexually through outcrossing.

Recent research on allozyme diversity showed that genetic diversity was high (compared to many narrowly endemic plant taxa) and populations were only moderately differentiated, suggesting that gene flow among populations is still high and any recent fragmentation has not yet affected genetic diversity. Maintaining the existing large population sizes is an important component in maintaining gene flow among populations (Neel and Ellstrand 2001).

Population Status and Trends

Global: G2, Imperiled (NatureServe 2011, Conservation Status last reviewed 2006)

State: S2, Imperiled (CDFW 2013b)

The current population status of Parish's daisy is unclear and there is a discrepancy in total reported occurrences of the species. According to the final listing rule in 1994, Parish's daisy was known from fewer than 25 occurrences with a total estimated population size of 16,000 individuals, but at that time, the San Bernardino National Forest had mapped 87 site-specific occurrences (USFWS 2009). USFWS (2009) notes that what constitutes an occurrence has been subjectively defined over various surveys, making it difficult to specify status or change in status of Parish's daisy since it was listed. In addition, there has been an increase in survey efforts for this species since listing that

has resulted in an increase in the number of occurrences detected. Sanders (2006) characterizes Parish's daisy as one of the more common carbonate endemics of the San Bernardino Mountains. Nonetheless, there have not been any systematic population studies conducted over time to document population trends.

Threats and Environmental Stressors

The main threat to Parish's daisy is limestone mining because this species is mostly restricted to carbonate deposits (USFWS 2009). Besides direct impacts, dust and artificial lighting can affect the species through dust impacts on soil chemistry and lighting availability for seeds and the impacts of artificial lighting on growing conditions (USFWS 2009). Sanders (2006) notes that after moistening, the mining dust appears to harden into a cement-like coating. Additional threats listed by USFWS and CNPS include energy development projects, off-highway vehicles, fuel-wood collection, fire suppression activities, camping, target shooting, road construction, and residential developments, but these threats are relatively low compared to mining (USFWS 2009; CNPS 2011).

The specific potential effects of climate change on Parish's daisy are unknown, but if climate change caused a shift to higher elevations due to warmer and drier conditions, as has occurred with other plant species on the Santa Rosa Mountains of Southern California (Kelley and Goulden 2008), this endemic species could be concentrated in a smaller area and more vulnerable to extinction (USFWS 2009).

Conservation and Management Activities

The *San Bernardino Mountains Carbonate Plants Draft Recovery Plan*, prepared by the USFWS in 1997, addressed Parish's daisy and four other federally listed species: Cushenbury buckwheat, Cushenbury milk-vetch, San Bernardino Mountains bladderpod (*Physaria kingii* ssp. *bernardina*), and Cushenbury oxytheca (USFWS 1997). The Recovery Plan for these species included the following recovery criteria:

1. Sufficient habitat protected in a reserve system for persistence of existing populations in their ecological context, including the largest populations and best and manageable habitat

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2. Identification of potential buffer zones, although not necessarily secured, with an estimate of 4,600 acres needed for habitat connectivity, buffers, and a natural community context
3. Population monitoring and habitat management to provide for early detection of population instability in the reserve system
4. Expansion of existing populations or reintroductions to reduce the chance of extinction due to randomly occurring events.

Based on these recovery criteria, the Recovery Plan identified the following actions:

1. Protect significant extant populations in a reserve system on federally owned land, which would include buffer zones, and maintain selection habitat connections
2. Restore habitat and conduct reintroductions and/or population enhancements where appropriate and feasible
3. Identify and implement appropriate management measures
4. Monitor populations
5. Conduct limited surveys and taxonomic assessments to find new populations.

The Recovery Plan identified the USFS, BLM, California Department of Fish and Game, and USFWS as the agencies primarily involved in the recovery effort (USFWS 1997).

In 2003, the *Carbonate Habitat Management Strategy* (CHMS) was developed by the USFS and BLM in collaboration with a Working Group consisting of mining interests, private landowners, and conservation groups to address impacts to the five federally listed plants associated with carbonate habitats (Olsen 2003). The CHMS, which covers about 160,000 acres (called the Carbonate Habitat Management Area or CHMA), has three main objectives:

1. Economic: regulatory certainty for mining activities, protection of the viability of mining, and streamlining and cost reduction of the permitting process
2. Conservation: maintenance and management of geomorphic and ecological processes of the landscape and placement of

habitat blocks to maintain the carbonate plants, to avoid jeopardy (per Section 7 of the federal Endangered Species Act) and adverse modification or destruction of critical habitat, to contribute to recovery, and to avoid future listings

3. Regulatory: streamlining of permitting, California Environmental Quality Act (CEQA) review, streamlining of County implementation of the California Surface Mining Reclamation Act, and to allow BLM and USFS to comply with certain court-ordered stipulations stemming from lawsuits (i.e., *Center for Biological Diversity v. BLM* and *Southwest Center for Biological Diversity v. Sprague*).

The CHMS includes delineation of an Initial Habitat Reserve, designation of Conservation Units within the CHMA whereby loss and conservation of habitat values can be objectively measured, and contribution by federal agencies and mining interests to reserve assembly through various mechanisms (e.g., dedication of existing unclaimed federal land, purchase of private lands or lands with mining claims, land exchanges, or conservation banking) (Olsen 2003).

Upon successful completion, the CHMS would meet or exceed recovery criteria 1 and 2 listed previously (USFWS 2009).

Implementation of the CHMS has been incorporated by the USFS into the Land Management Plans for the Angeles and San Bernardino National Forests (USFS 2005) and by the BLM into the West Mojave Plan (BLM 2005).

Within the Plan Area, a large percentage of the known populations occur on BLM-administered lands that are covered under the West Mojave Plan (BLM 2005). However, it is estimated by the USFWS that 73% of these lands are under claim to mining companies and development of these sites will make conservation difficult (Sanders 2006). One population around Three Sisters Peak West is under non-profit control, which presumably will have conservation benefits for the species.

Data Characterization

The general distribution of Parish's daisy is fairly well known, based on its close association with carbonate substrates and increased

survey efforts since its federal listing as endangered in 1994 (67 FR 78570–78610). However, its population status in terms of population trends is not well understood due to subjective mapping of occurrences between the different survey efforts and a lack of systematic studies carried out over time (USFWS 2009).

Management and Monitoring Considerations

To achieve species recovery, the USFWS (2009) has identified several management and monitoring strategies that need to be implemented for Parish's daisy. These strategies include:

1. Working with the San Bernardino National Forest to conduct systematic monitoring of Parish's daisy throughout known and potentially occupied sites
2. Within occupied Parish's daisy habitat continue monitoring programs for the effectiveness of measures to protect the species from recreation activities
3. Avoid new developments in or near Parish's daisy habitat.

Research by Mistretta and White (2001) indicates that restoration of Parish's daisy population can be successful. A total of 66% of plants transplanted to a disturbed but irrigated site in 1991–1992 survived a 6-year monitoring period. In addition, successful recruitment of progeny was reported at the restoration site. Sanders (2006) suggests that Parish's daisy may be better able to recover after disturbance than some carbonate endemics.

Species Modeled Habitat Distribution

This section provides the results of habitat modeling for Parish's daisy, using available spatial information and occurrence information, as appropriate. For this reason, the term “modeled suitable habitat” is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 187,517 acres of modeled suitable habitat for Parish's daisy in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat for Parish's daisy in the Plan Area.

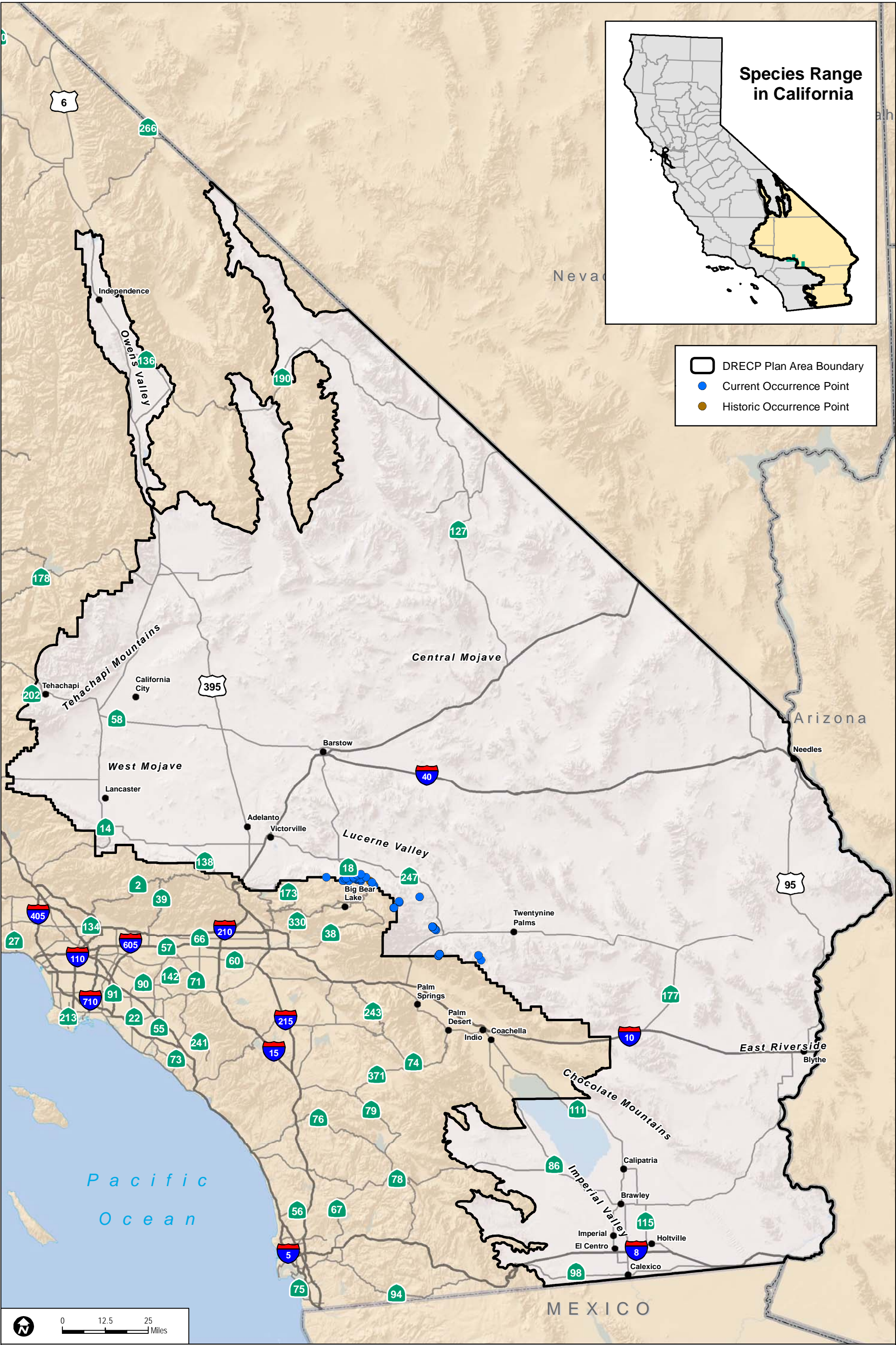
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Sources: ESRI (2014); DRECP Species Occurrence Database (2013), CWHR (2008)

FIGURE SP-P09
Parish's Daisy Occurrences in the Plan Area